



TURTLES



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CBNERRS Discovery Lab
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How Would You Describe a Turtle?

- Reptile
- Special bony or cartilaginous shell formed from ribs
- Scaly skin
- Exothermic ("cold-blooded")
- Breathe air
- Aquatic & terrestrial
- Lay eggs on land
- Herbivores, carnivores, & omnivores



Are They Turtles, Tortoises, & Terrapins?

- All refer to species within the supraorder Chelonia
- Turtle refers to all species in general
- Tortoise
 - usually refers to any land-dwelling, non-swimming chelonian
- Terrapin based on Algonquian for "edible turtle"



From Around the World

Pig-nosed Turtle



Big-headed Turtle



Spiny Turtle



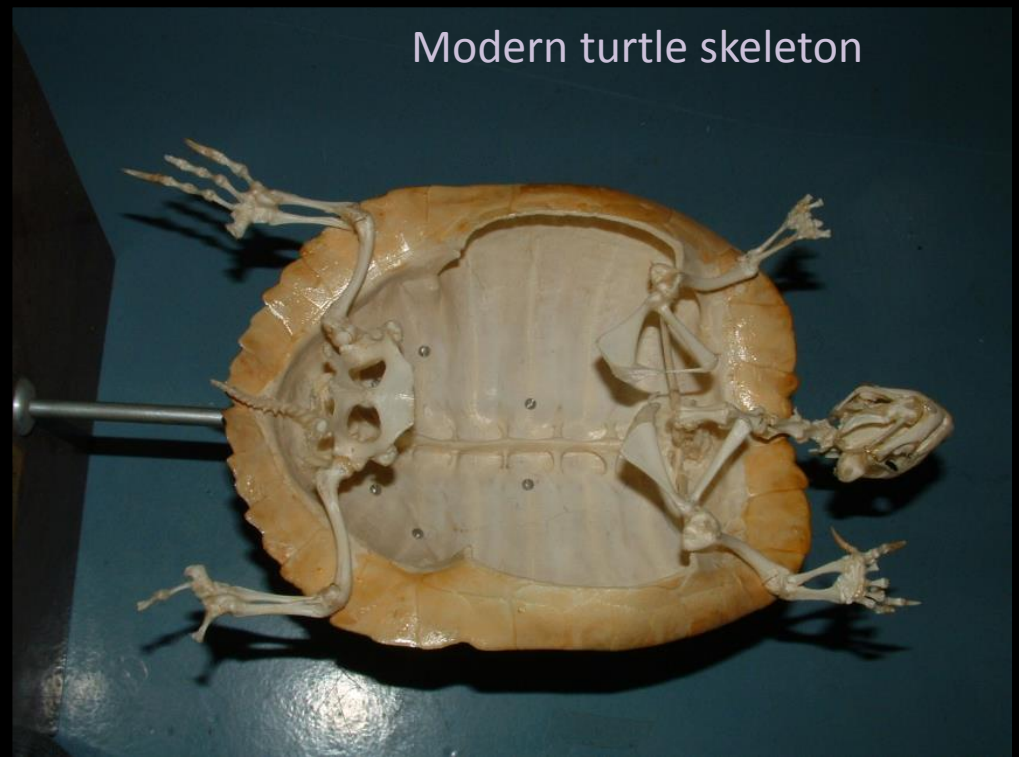
Spiny Soft-shelled Turtle





Ancient group
of reptiles

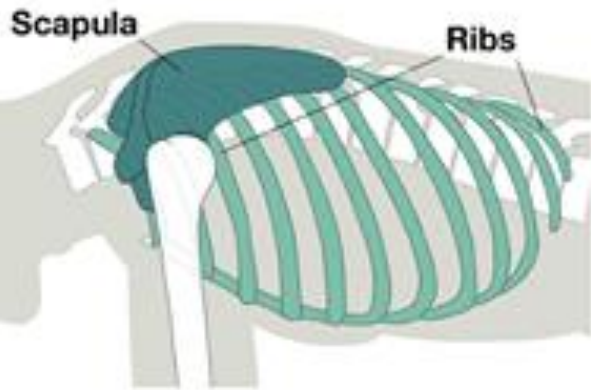
Fossil turtle (~220 million years old)
Odontochelys semitestacea
Found in China



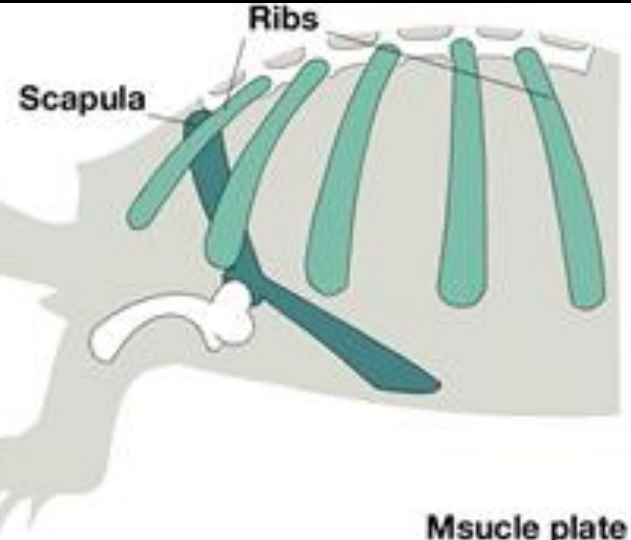
Modern turtle skeleton

Important Modification for Shell Development

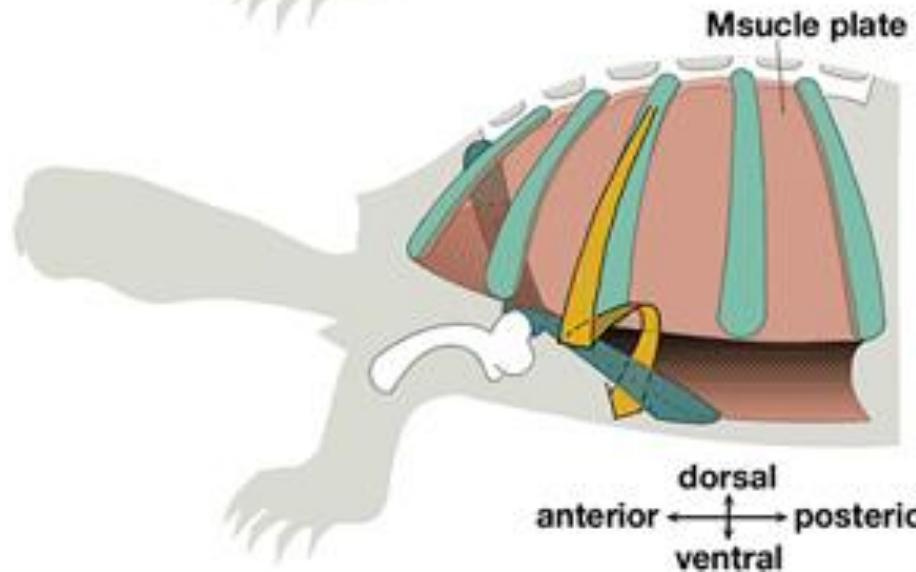
Human



Turtles



Muscle plate



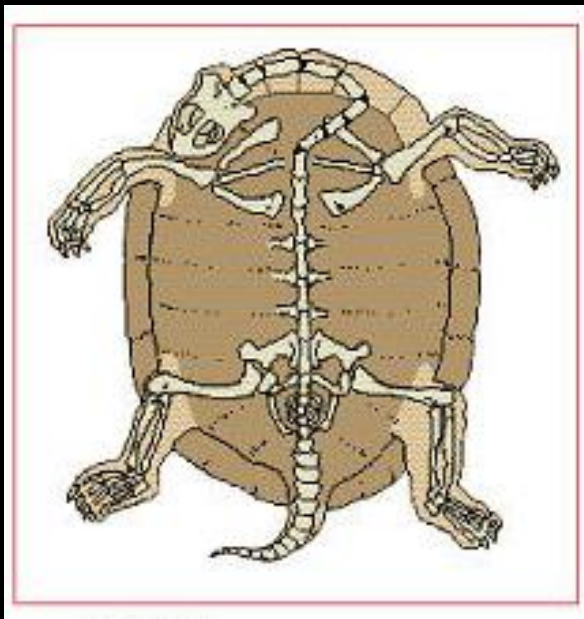
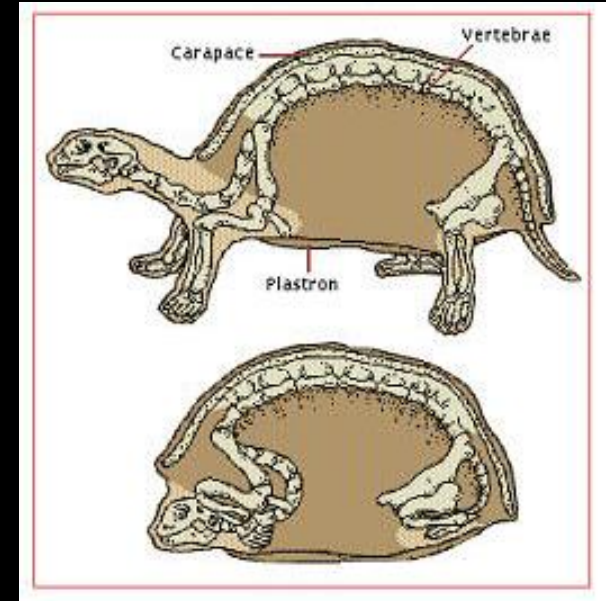
Two Groups based on Neck Retraction:

Cryptodira

draw their necks in while contracting it under their spine

Pleurodira

contract their necks to the side



Turtles of Virginia (www.virginiaherpetologicalsociety.org)

1. *Trachemys scripta troostii* (Cumberland Slider) only in southwestern VA
2. *Trachemys scripta scripta* (Yellow-bellied Slider) southeaster VA & near DC
3. *Trachemys scripta elegans* (Red-eared Slider) spotty distribution central-eastern VA
4. *Terrapene carolina carolina* (Eastern Box Turtle) all throughout VA
5. *Sternotherus odoratus* (Eastern Musk Turtle) all throughout VA
6. *Sternotherus minor peltifer* (Stripe-necked Musk Turtle) extreme southwestern point of VA
7. *Pseudemys rubriventris* (Northern Red-bellied Cooter) all of eastern VA
8. *Pseudemys concinna floridana* (Coastal Plain Cooter) extreme southeastern VA
9. *Pseudemys concinna concinna* (Eastern River Cooter) central & southwestern VA
10. *Malaclemys terrapin terrapin* (Northern diamondback terrapin) coastal eastern VA
11. *Kinosternon subrubrum subrubrum* (Eastern Mud Turtle) central to eastern VA
12. *Kinosternon baurii* (Striped Mud Turtle) eastern VA
13. *Graptemys geographica* (Northern Map Turtle) extreme southwestern VA
14. *Glyptemys muhlenbergii* (Bog Turtle) southwestern-central VA
15. *Glyptemys insculpta* (Wood Turtle) Northern-most VA State threatened
16. *Deirochelys reticularia reticularia* (Chicken Turtle) southeastern VA limited, State Endangered
17. *Clemmys guttata* (Spotted Turtle) central-eastern VA
18. *Chrysemys picta picta* (Eastern Painted Turtle) throughout VA
19. *Chelydra serpentina* (Snapping Turtle) througout VA
20. *Apalone spinifera spinifera* (Eastern Spiny Softshell) extreme far southwestern VA

Virginia's Sea Turtles:



Loggerhead sea turtles (*Caretta caretta*)

http://www.scaquarium.org/seaturtle/images/home/home_corners2_03.jpg



**Kemp's ridley sea turtle
(*Lepidochelys kempii*)**

<http://www.dnr.state.md.us/fisheries/oxford/research/fwh/taggingstudy/kemps.jpg>



**Leatherback sea turtle
(*Dermochelys coriacea*)**

Photo: R. Boettcher, VA DGIF



**Green sea turtle
(*Chelonia mydas*)**

<http://jrscience.wcp.muohio.edu/Photos/GreenTurtleLargo97.jpeg>



**Hawksbill sea turtle
(*Eretmochelys imbricata*)**

<http://www.esasuccess.org/reports/gallery/images2/Atlantic-Hawksbill-sea-turtle-NOAA.jpg>

Leatherback Sea Turtles

Dermochelys coriacea

- **General:** No hard shell or scutes; highly migratory open water species
- **Status:** "Endangered"; Pacific populations in crisis
- **Size:** Largest sea turtles (6 feet+ long), weighing up to 2000 lbs
- **Sexual maturity:** unknown..
- **Nesting Habitat:** tropical beaches, some nesting in FL; open beach
- **Juvenile Habitat:** unknown...!
- **Virginia:** 6 to 10 strandings per year; all adults; recent influx into Bay; Average in VA ~ 54 in (138 cm)
- **Diet:** gelatinous species (jellyfish/squid)
- **Foraging Habitat:** coastal and ocean based



<http://getinvolved.conservation.org/images/content/pagebuilder/10733.jpg>

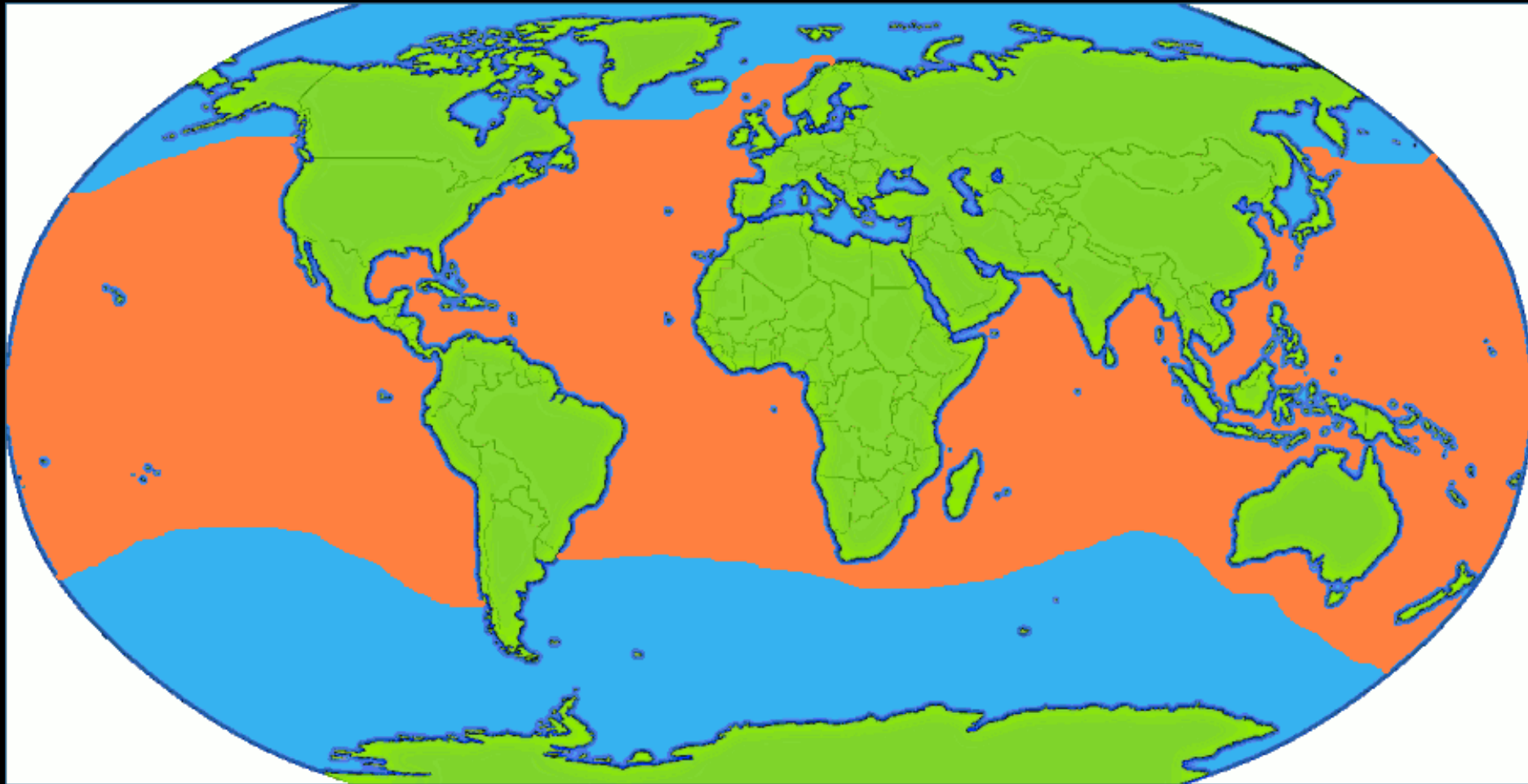


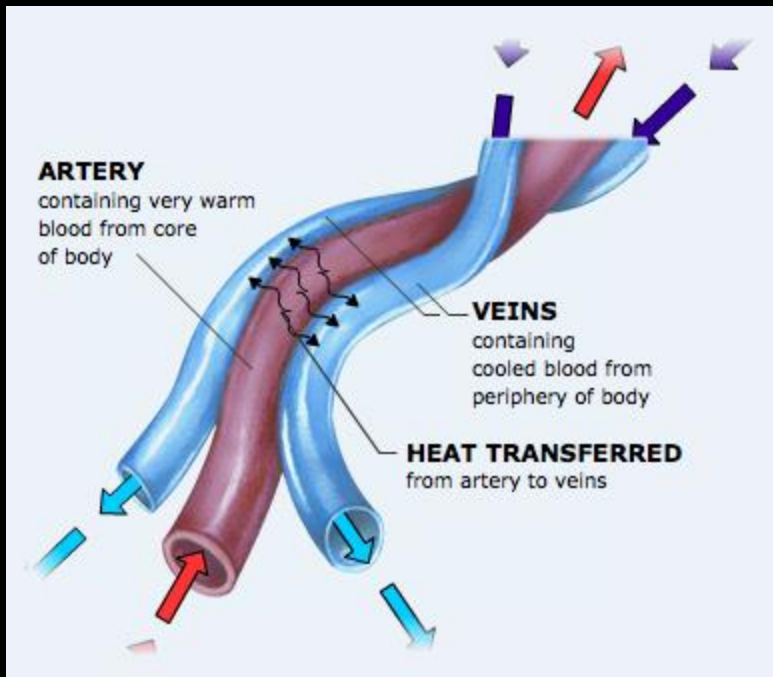
<http://www.sciencedaily.com/images/2008/02/080214144429-large.jpg>



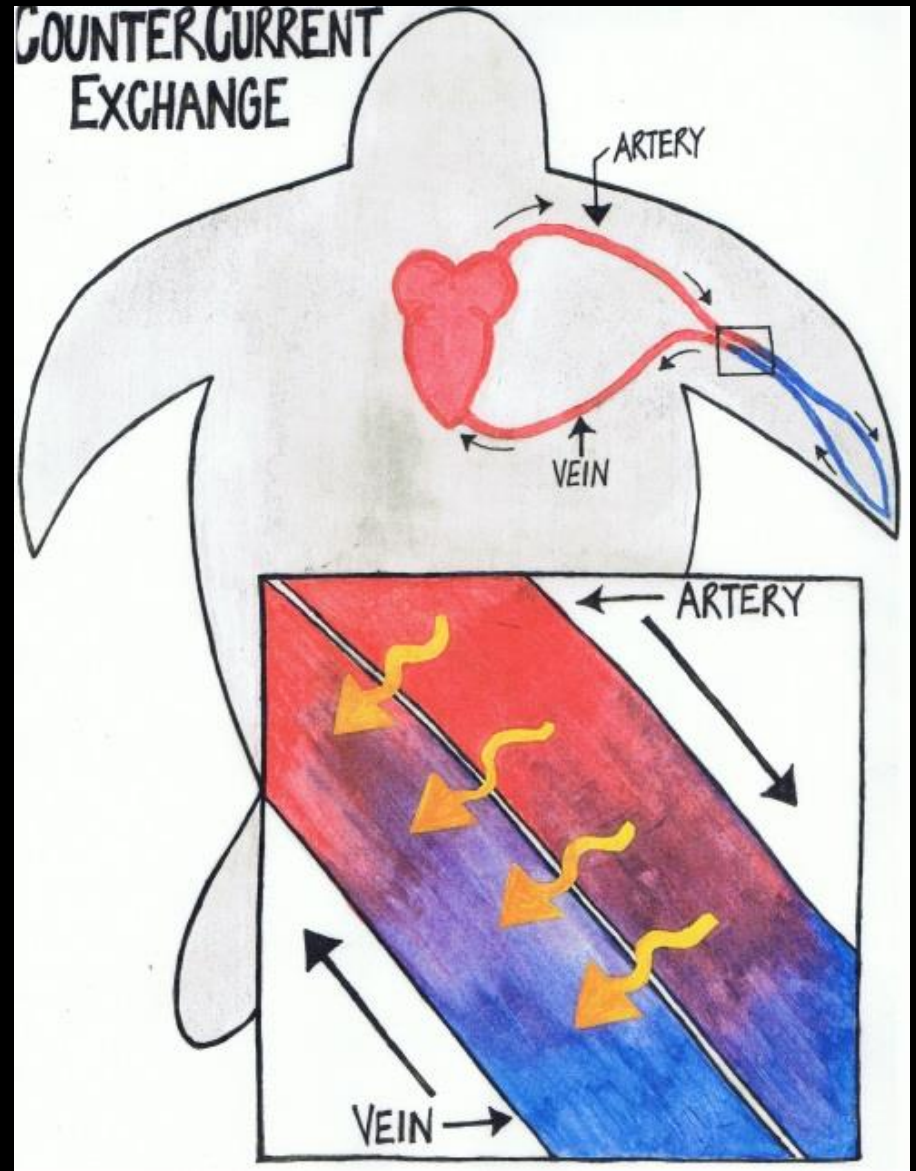
http://www.bioko.org/images/medium/turtle_brandi.jpg

Global Distribution for Leatherback Sea Turtles





Countercurrent Heat Exchange



Diamondback terrapin (*Malaclemys terrapin*)

Photo: D. Tulipani



Photo:
M.A.
Koeppen



Photo:
M.A.
Koeppen



Photo:
M.A.
Koeppen

Photo:
S. Powell

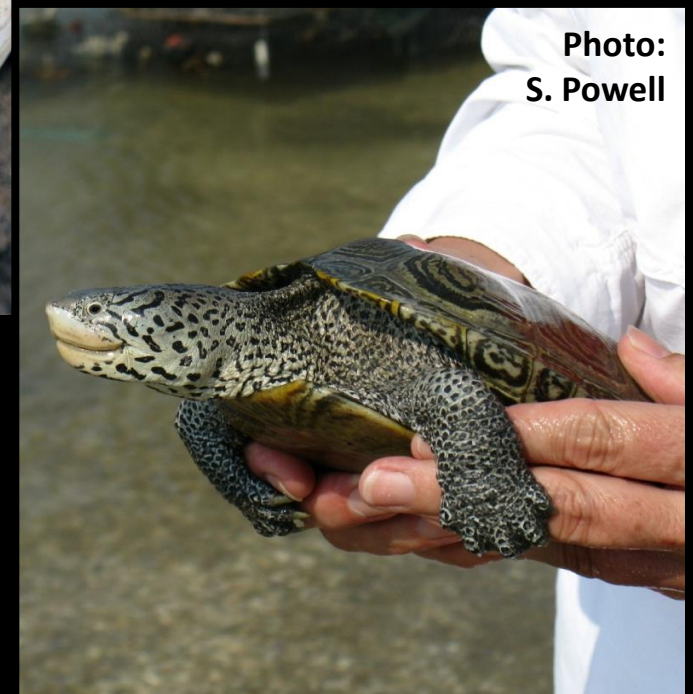


Photo: L. Hardin



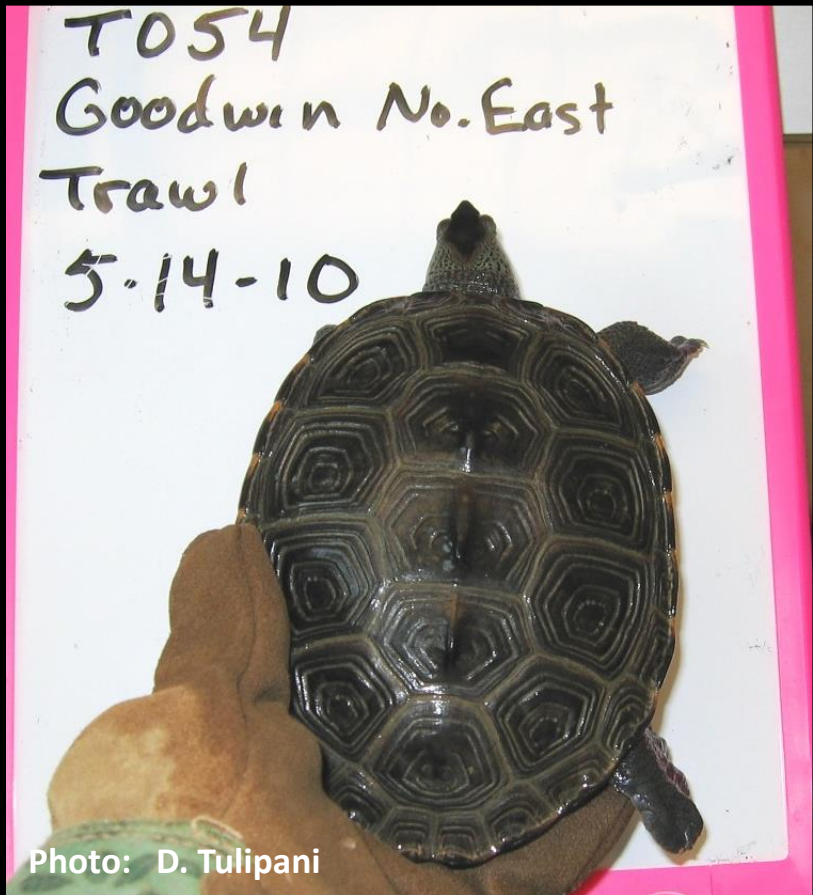
Diamondback terrapins (*Malaclemys terrapin*)

- Long-lived species (~ 40 yrs)
- Delayed sexual maturity
 - males - 3-6 yrs
 - females - 6-13 yrs
- Gender-Size Dimorphism
 - adult males - SCL 10-14 cm
 - adult females - SCL 15-23 cm
- Low fecundity
 - 5-20 eggs/clutch
 - 2-3 clutches/summer
 - 60-90 days incubation
 - Low survivorship
 - 1-3% eggs to hatchling

(Roosenburg 1991)



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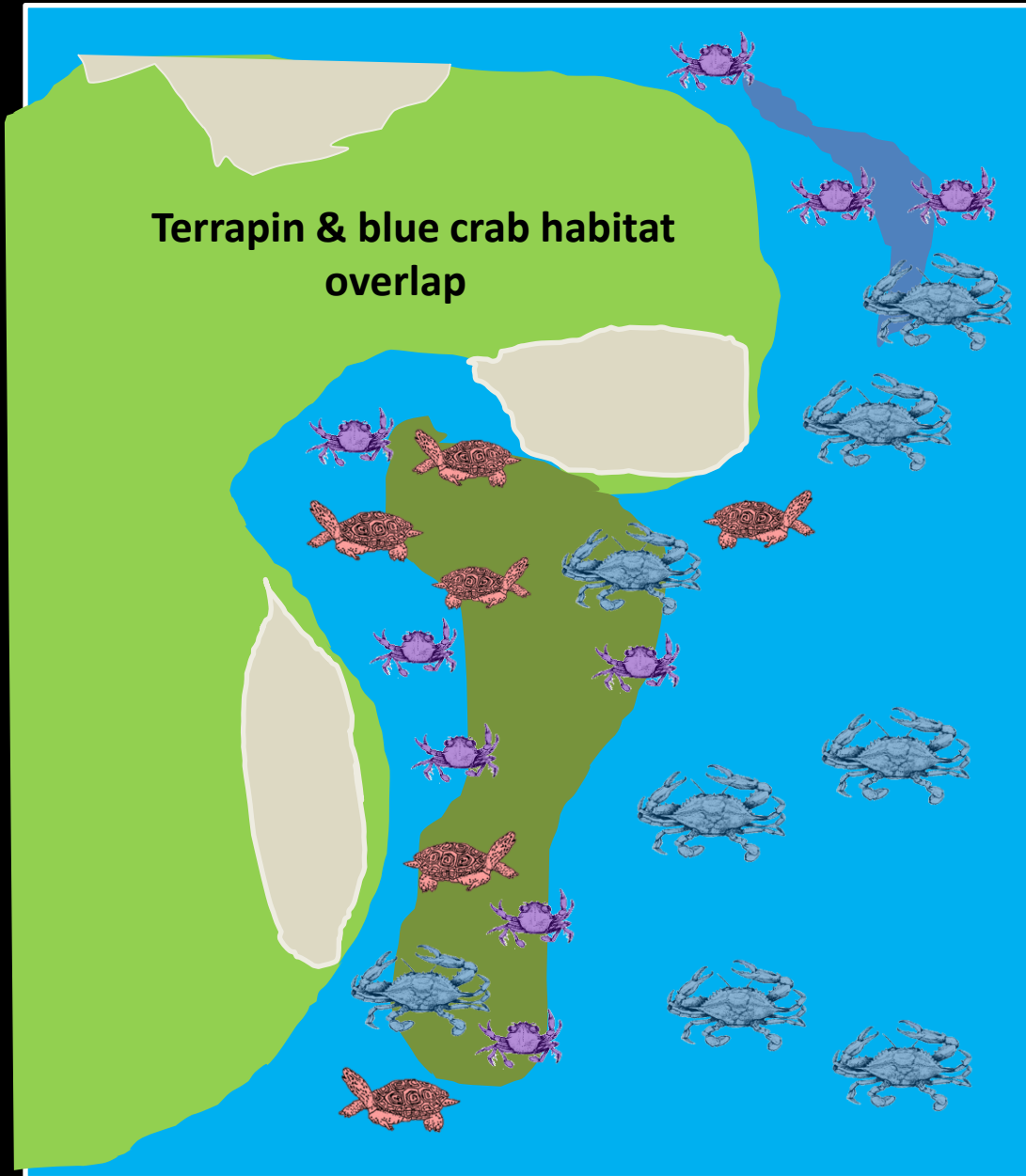


Photo: D. Tulipani



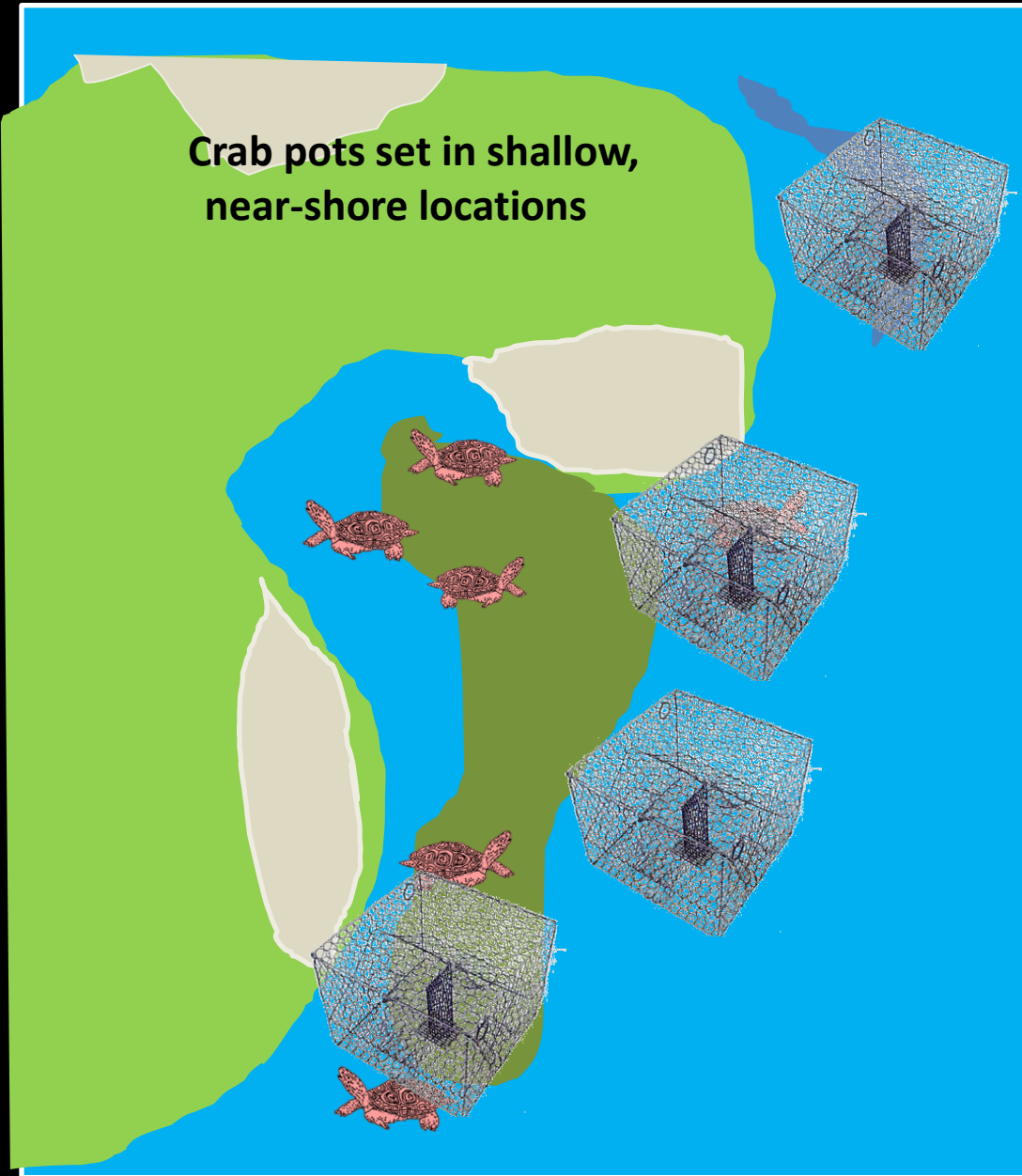
Photo:
M.A.
Koeppen

Chesapeake Bay Coastal Habitats



Chesapeake Bay Coastal Habitats

Crab pots set in shallow, near-shore locations



Chesapeake Bay Coastal Habitats



Bycatch in Blue Crab Fisheries

- Juveniles & adult males more likely to enter crab pots & drown
 - ✓ Size
 - ✓ Habitat use
- Crab pots set in shallow, near-shore locations
 - Actively fished
 - “Ghost” pots



Photo:
D. Tulipani



Photo: D. Tulipani

Incidental Capture of Diamondback Terrapin by Crab Pots

JAMES I.
Marine
South C
Post Of
Charles

Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles—An International Conference, pp. 21-27
© 1997 by the New York Turtle and Tortoise Society

The Impact of Commercial Crab Traps on Northern Diamondback Terrapins, *Malaclemys terrapin terrapin*

Diamondback Terrapin (*Malaclemys terrapin*) Mortality in Crab Pots

WILLEM M. ROOSENBURG,*‡ WILLIAM CRESKO, †‡ MICHAEL
AND MATTHEW B. ROBBINS||

Chelonian Conservation and Biology, 2000, 3(4):735-737
© 2000 by Chelonian Research Foundation

Chelonian Conservation and Biology, 2009, 8(1): 98-100
© 2009 Chelonian Research Foundation

Diamondback Terrapin Mortality in Crab Pots in a Georgia Tidal Marsh

ANDREW M. GROSSE¹, J. DANIEL VAN DIJK¹,
KERRY L. HOLCOMB¹, AND JOHN C. MAERZ¹

Use of a Marked Population of Diamondback Terrapins (*Malaclemys terrapin*) to Determine Impacts of Recreational Crab Pots

MARGARET E. HOYLE^{1,2} AND J. WHITFIELD GIBBONS¹



OOD



Impact → Solution

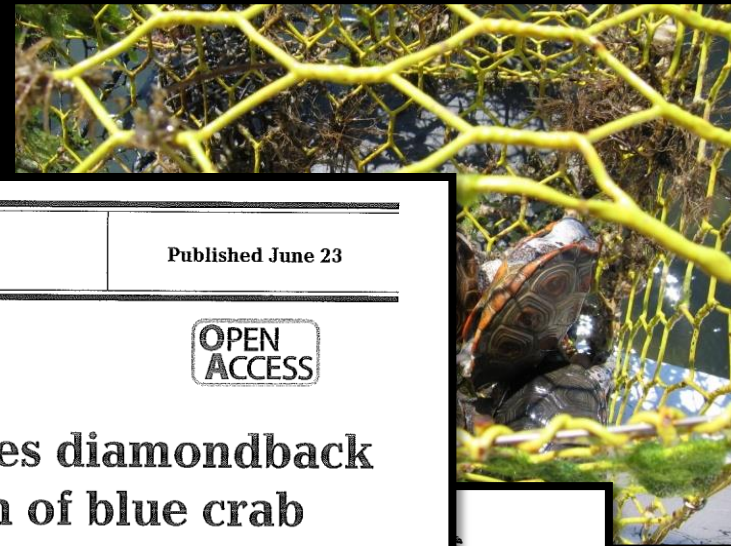


Photo: D. Tulipani



Photo: D. Tulipani

Impact → Solution



Ecological Applications
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Mar Ecol Prog Ser

Published June 23

OPEN
ACCESS

Bycatch reduction device conserves diamondback terrapin without affecting catch of blue crab

Megan A. Rook^{1,*}, Romuald N. Lipcius², Bret M. Bronner¹, Randolph M. Chambers¹

Estuaries and Coasts
DOI 10.1007/s12237-010-9330-1

NOTE

A Test of Bycatch Reduction Devices on Commercial Crab Pots in a Tidal Marsh Creek in Virginia

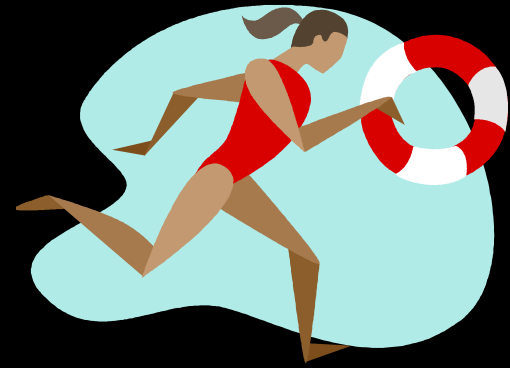
A. Scott Morris · Stephanie M. Wilson · Erik F. Dever ·
Randolph M. Chambers

JOSEPH A. BUTLER^{1,*} and GEORGE L. HEINRICH²



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East

Be a **lifesaver**



...Use **BRDs** & **Save Terrapins**